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Biochimica et Biophysica Acta 1757 (2006) 285
BIOCHIMICA ET BIOPHYSICA ACTA
BBA
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Preface

Development of cellular bioenergetics: From molecules to physiology and pathology

This special issue is focused on the present state of the art in Bioenergetics. The articles are written by invited reviewers of the XIVth European Bioenergetic Conference, held in Moscow on 22–27 July, 2006. The meeting included twelve sessions "Respiratory chain", "ATP-synthase and ATPase", "Light-driven energy transducers", "Energy-consuming porters", "Coupling mechanisms", "Uncoupling", "Reactive oxygen species", "Aging", "Cancer, ischemia and degenerative disorders", "Programmed death of the cell (apoptosis and necrosis) and of the mitochondrion (mitoptosis)", "Dynamics of mitochondrial morphology", "Therapeutic approach".

Last two years passed since XIIIth EBEC in Pisa, Italy revealed further progress in bioenergetics researches in both molecular biology and physiology. As highlighted by the articles included in this volume membrane potential generation, apoptosis, uncoupling as well as reactive oxygen species appear to be fascinating entities. They play key role in many cellular processes, mitochondria has been assumed to be central component of cell life and programmed death. Presented manuscripts report novel information about structure and catalytic properties of membrane ATPases from various sources. Reviews and experimental papers observe progress in study of light-harvesting and energy transformation in chloroplasts. As usual, some papers are devoted to discussion on mechanisms of proton translocation in mitochondria, especially through operation of cytochrome oxidase cycle. A progress in studies on regulation and physiological significance of uncoupling proteins family is reviewed. Investigations in superoxide production by mitochondria, connected to regulatory effects of reactive oxygen species and to participation of oxygen radicals in apoptotic signal transmission from cell to cell are also described. Studies of key role of cytochromes release in apoptosis induction give us new information about complicate network of proteins, phospholipids and other factors regulating mitochondrial reticulum state. Another new topic is yeast programmed death possessing presenting us many apoptotic features. Last two years reveal interesting perspectives in therapy of mitochondrial diseases. This volume contains some impressive samples of bioenergetics application to effective medical treatments of patients. Numerous studies on the above topics are currently in progress and there is no doubt that next XVth EBEC (Dublin, 2008) will reinforce the interest given to energy-transducing membranes and to Bioenergetics in general.

In conclusion, I would like to thank all who are involved for their efforts: all the authors who sent us innovative manuscripts, efficient reviewers, and editorial staff of journal, especially Andrea Yturralde and Pat Crowley.

Vasily Popov

0005-2728/$ - see front matter © 2006 Published by Elsevier B.V.
doi:10.1016/j.bbabio.2006.06.007